

# Fever in the Deployed Soldier

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# Fever in Deployment

- ♦ Epidemiology is critical information
  - » Where are you located in the world?
    - » What infectious diseases are endemic in your theater of operations?
  - » Cities vs rural areas?
  - » Food or water exposure?
  - » Animal exposure? or New pets?
  - » How long have they been here?
  - » Did they recently arrive from the US?
  - » Illness while traveling vs illness upon return?
  - » Illness in those traveling with them?



# Fever in Deployment

- ♦ Don't forget the common problems despite travel
  - » URI's
  - » Pneumonia
  - » Sinusitis
  - » Cellulitis



- Specific etiologies resulting in illness are best approached by examining a differential diagnosis based on incubation periods
  - » Especially in illness after returning from deployments



## □ Short Incubation:

- » Viral infections - Dengue, diarrheal
- » Rickettsial
- » Infectious diarrheal



- ♦ Intermediate Incubation (8-30 days)
  - » Malaria-Malaria-Malaria-Malaria
  - » Enteric fevers
  - » Parasitic - amoeba
  - » Leptospirosis
  - » Lyme disease - especially Europe, US
  - » HIV - acute retroviral syndrome



## ♦ Long Incubation (>30 days)

- » Malaria - vivax
- » Viral hepatitis
- » Schistosomiasis
- » Filariasis - notable for related eosinophilia
- » HIV
- » Leishmaniasis - visceral primarily with fever
- » Tuberculosis



# Evaluation of Fever

## ♦ History and Physical

- » Rashes - subtle with Dengue
- » Hepatosplenomegaly
- » Jaundice
- » Conjunctival changes - primarily leptospirosis
- » Localizing swelling

## ▢ Evaluation of associated symptoms

- » Thin and thick smears
- » Stool cultures for diarrhea
- » Blood cultures
- » Eosinophil count





# Evaluation cont.

- ◆ Further work-up as indicated by history and physical
  - » CT for hepatomegaly
  - » Amoeba titers
- Work-up may depend on prior immunizations, PPD history.
- RPR and HIV depending on sexual history, blood exposure.
- Liver enzyme evaluation useful
  - » Rickettsial diseases
  - » Hepatitis



# Treatment

- ✦ Depends on risks of certain diseases
  - » Patient on prophylaxis for malaria may need empiric therapy despite negative smears.
- ▢ Empiric therapy of dysentery
- ▢ Empiric therapy for enteric fevers
- ▢ If CT positive for liver abscess, therapy for amoeba
- ▢ Empiric doxycycline for suspected rickettsial diseases



# Malaria

## ♦ Two major forms

- » Falciparum - associated with very high levels of parasitemia
  - » Fatal disease if untreated
  - » No hypnozoite stage (persistent liver stage)
- » Vivax - milder form with lower parasitemia
  - » Hypnozoite stage resulting in recurrences if terminal prophylaxis not given with primaquine



# Malaria

Know the epidemiology before,  
during, and after travel

- ♦ Chloroquine sensitive malaria

- » Egypt
- » Saudi Arabia
- » Turkey
- » Iraq
- » UAE
- » Syrian Arab Republic
- » Central America west of Panama Canal
- » Haiti and Dominican Republic



# Malaria

- ◆ Chloroquine resistant malaria
  - » Everywhere else!!!
- Mefloquine resistance
  - » Thailand bordering Cambodia and Myanmar
  - » ??Laos, Vietnam, etc.



# Malaria - Common Problems

- ◆ Compliance with prophylaxis
  - ▢ Prophylaxis failure resulting in negative smears and malaria that may be difficult to diagnose
  - ▢ Wrong medication used for prophylaxis
  - ▢ Forgetting terminal prophylaxis
  - ▢ Excluding malaria with single smear - never rules out malaria adequately
  - ▢ Abdominal complaints misleading clinicians
  - ▢ Inexperience with diagnosis and therapy



# Dengue Fever

- ✦ Very short incubation period of 2-7 days
- ▢ Clinical presentation is marked by fever, headache (retro-orbital), severe myalgias/arthralgia (breakbone fever) and a blanching erythroderma.
- ▢ Some patients have a biphasic nature to there fever pattern which recurrns when the rash appears.
- ▢ Self-limited benign illness first time



# Dengue Fever

- ♦ Common laboratory findings include:
  - » neutropenia
  - » thrombocytopenia
  - » transaminase elevation
- ▢ Don't be confused by Dengue Hemorrhagic Fever, Dengue Shock Syndrome.
  - » These patients have prior Dengue fever infections
  - » Hemoconcentration and severe illness are the features
- ▢ Diagnosis made clinically and with IgM testing after fever resolution





# Rickettsial Diseases

- ♦ World wide distribution of various types
  - » Spotted fever group - RMSF, Queensland tick typhus, Rickettsialpox
  - » Typhus group - epidemic typhus, scrub typhus
- ▢ Vectors vary from ticks to lice to fleas to mites
- ▢ Almost all rickettsia infect endothelial cells (except Ehrlichiosis and Q fever) and every organ has endothelial cells
  - » Helps to think of these as systemic infections with multiple organ system involvement



# Rickettsial Diseases

- ◆ Fever and rash in some
- Eschar at site of infection/inoculation in some
- Common themes in laboratory findings
  - » Neutropenia
  - » Thrombocytopenia
  - » Transaminase elevation
  - » Aseptic meningitis
  - » Renal and pulmonary involvement in severe cases



# Rickettsial Diseases

## ♦ Rules of thumb

- » You will never make a definitive diagnosis before the patient recovers with treatment or dies
- » High index of suspicion with good understanding of epidemiology of deployment important for diagnosis
- » Empiric therapy with doxycycline with a **VERY** rapid improvement after only a few doses
- » Save acute and convalescent sera for testing if possible and send to the CDC



# Acute HIV

- Many deployments to areas of the world with high rates of HIV in commercial sex workers
- Acute retroviral syndrome very similar to acute EBV infection
  - » Pharyngitis
  - » Hepatitis
  - » Adenopathy
  - » Rash



# HIV

- ❑ Screening ELISA testing negative in acute syndrome
- ❑ High index of suspicion and investigation of risk factors
- ❑ Repeat testing in 3-6 weeks but counsel patient on infectious nature of disease
- ❑ Consider viral load testing early on for diagnosis if index of suspicion high and test is available



# Enteric Fever

- ✦ Term used for patients with gastrointestinal infections from bacteria - salmonella, campylobacter, etc.
- ▢ Patients have diarrhea, but in true typhoid fever may have constipation
- ▢ Positive blood cultures in many patients
- ▢ Exposures to unsafe food and multiple cases suggestive
- ▢ Empiric therapy with quinolones for severe cases best choice, but many mild cases resolve without therapy
- ▢ Most important therapeutic consideration is volume repletion/maintenance



# Conclusion

- ❑ Understand the epidemiology of exposure
- ❑ Understand the importance of knowing the diseases to which you/your soldiers will be exposed
- ❑ The broad nature of infections possibly responsible for fever in the deployed soldier
- ❑ The importance of preventive measures



The End

